

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 6

April, 1904

No. 64

THE NORTH AMERICAN ALLIES OF SCIRPUS LACUSTRIS.

AGNES CHASE.

(Plates 52 and 53.)

IN the hope of clearing up confusion in regard to our Great Bulrush the accompanying plates have been prepared and the following descriptions drawn up after study of the specimens of this group in the National and Gray Herbaria, herbaria of the New England Botanical Club and of the Field Columbian Museum, and in a few private herbaria.

Scirpus validus was clearly described by Vahl and this name was taken up by the earlier American botanists. From the brief description of *S. lacustris* in Species Plantarum (p. 48) it is impossible to decide which species of the group Linnaeus had in mind, but the type locality is given as "Europae," and the descriptions of *S. lacustris* L. by Kunth (Enum. Pl. 2:164), Vahl (Enum. Pl. 2:268), and Reichenbach (Icones Fl. Germ. 7:41, plate 106) clearly describe the specimens with 3-cleft styles from Scandinavia, Germany and France found in the above herbaria. This European *S. lacustris* is a plant with spikelets usually in capitate clusters; smooth scales (the excurrent tip of the midrib alone being scabrous) one-fourth or more longer than the achene; style 3-cleft; achene 1.7-1.8 by 3 mm., triquetrous, the ventral facet broadest and the dorsal angle obtuse; and the involucre bract flat or plano-convex, the margins scabrous. The European bulrush with 2-cleft style, described as *S. Tabernaemontani* Gmel. Fl. Bad. 1:101, and figured in Reichenbach's Icones (7:41, plate 107), is, to judge from descriptions, plate and numerous speci-

mens in the Gray Herbarium, clearly distinct from *S. lacustris* L., though reduced to synonymy in the Kew Index. To this form our American *S. validus* and *S. occidentalis* are more nearly allied than to *S. lacustris* L.

The achene-characters here given are based on study of mature plants; and achenes for measurement and illustration are in each case taken from the lower part of the spikelet, the upper achenes being found less characteristic and almost invariably smaller than the lower ones.

KEY TO AMERICAN ALLIES OF SCIRPUS LACUSTRIS.

Achene lenticular, style 2-cleft:

Bristles 4-6, slender:

Achene 2 mm., scales but little longer *S. validus.*

Achene 2.5-3 mm., scales $\frac{1}{4}$ - $\frac{1}{3}$ longer *S. occidentalis.*

Bristles 2, broad, ciliate below *S. Californicus.*

Achene triquetrous, style 3-cleft; bristles 2-4, fragile,

unequal *S. heterochaetus.*

SCIRPUS VALIDUS Vahl Enum. Pl. 2: 268 (1806).

Scirpus lacustris of American authors not Linnaeus.

Perennial: rootstock horizontal: culm erect, 1.2-2.5 m. high, 0.8-2.5 cm. in diameter at base, attenuate upward, terete, soft, usually flattened in dried specimens, light green, smooth, minutely striate, leafless, or the basal sheaths produced into narrow acuminate blades (1-15 cm. long); sheaths membranaceous with a hyaline border and ligule, usually lacerate: inflorescence a decompound, lax, one-sided, more or less drooping umbel of numerous spikelets subtended by a single erect, attenuate, terete bract, channeled only at the base (1-6 cm. long); rays 1-6 cm. long, slender, plano-convex, the margins scabrous; bractlets vaginate, light brown to chestnut, acute or acuminate scarious, pubescent toward the summit, fimbriate-ciliate, the midrib excurrent into a scabrous tip; secondary rays 0.5-4 cm. long, slender: spikelets usually solitary or in capitate clusters of 2-3 (rarely 4 or 5) ferruginous to chestnut, ovoid to oblong-ovoid, acute or becoming obtuse as terminal achenes mature, 3-4 by 5-10 (usually 7) mm.: scales equalling or slightly longer than the achenes and rounded over them, broadly ovate or nearly orbicular, obtuse or emarginate, spotted with chestnut or purplish brown, pubescent along the midrib and at the summit with thick stubby hairs, ciliate; the strong green or pale midrib exerted into a short scabrous tip: bristles 4-6 (usually 6) shorter, equalling or longer than the achene (usually slightly longer), reddish brown, retrorsely barbed: style 2-cleft to

near the base: achene fuscous or grayish black when fully ripe (flavescent before maturity often falling without turning dark), rounded obovoid, abruptly mucronate, 1.3–1.5 by 2 (rarely 2.2 or less than 2) mm., in section plano-convex, or the ventral side slightly convex above, hexagonally reticulate under a lens.

Type locality: "Habitat in Caribaeis."

Specimens examined. NOVA SCOTIA, Halifax (*Howe & Lang* 1602): ONTARIO (*Macoun* 34,583): MANITOBA (*Bourgeau*): MAINE, Fort Fairfield (*Fernald* 2091); Marshfield (*Fernald*); Cumberland Co. (*Ricker* 323); Monmouth (*Merrill* 1133); New Sharon (*Knowlton*); Sumner (*Parlin*); Wells (*Furbish*); South Chesterville (*Eaton*): NEW HAMPSHIRE, Pelham (*Knowlton*); Jaffrey (*Robinson* 327): VERMONT, Shelburne Pond (*Flynn*); Manchester (*Day* 200): MASSACHUSETTS, East Gloucester (*Swan*); Malden (*Collins*); Westford (*Manning*); Cambridge (*Perkins*); Pittsfield (*Hoffmann*): RHODE ISLAND, Providence (*Regester & Collins*): CONNECTICUT, Southington (*Andrews* 425, *Bissell* 895); East Haven (*Winton*): NEW YORK (*Lucy* 2225, *Millsbaugh*): PENNSYLVANIA (*Heller*): VIRGINIA (*Small*): NORTH CAROLINA (*Coville* 57, *Vasey*): SOUTH CAROLINA (*Ravenel*): GEORGIA (*Harper* 160, 575): FLORIDA (*Simpson* 373, *Nash* 1262, *Biltmore Herb.* 3310): TEXAS (*Bigelow, Reverchon* 889): OHIO (*Selby* 321, *Young*): INDIANA (*Hill, Deam, Umbach, Young*): ILLINOIS (*M. S. Bebb, Stewart, V. H. Chase, A. Chase* 1136, 1677): MICHIGAN (*Clarke, Davis, Houghton, H. H. & D. R. Camp*): WISCONSIN (*Umbach*): MINNESOTA (*Mearns* 695, *Pammel* 437): IOWA (*Butler* 4, *Cratty, Fitzpatrick, Ball, Shimek*): KANSAS (*Shear* 239, *Norton* 549): NEBRASKA (*Clements* 2586, *Rydberg* 1276, 1388 in part — *Nat. Herb. no.* 210,395): MONTANA (*Shear* 397, *Rydberg* 2148, 3168): WYOMING (*A. Nelson* 454, 3651, 7605): COLORADO (*Wolf & Rothrock* 930, *Crandall* 510): ARIZONA (*MacDougal* 538): WASHINGTON (*Whited* 584, *Horner* 512): CALIFORNIA (*Orcutt, Heller* 5827): PORTO RICO (*Heller* 6290, *Sintenis* 3846): CUBA (*Wright* 713).

Scirpus validus Vahl is distinguished from *S. lacustris* L. by the 2-cleft style; by the lenticular achene $\frac{2}{3}$ as large as that of *S. lacustris*; by the scales equalling or but little larger than the achenes, pubescent along the midrib and at the summit; and by the terete involucre bract.

This species shows comparatively little variation, the most notable being that of the Florida, West Indian and Yucatan specimens and *MacDougal* 538 from Arizona, which have scales longer and more pubescent, and bristles nearly or quite $\frac{1}{3}$ longer than the achenes. As the type locality of *S. validus* is "in Caribaeis" it may be assumed that these subtropical specimens are the typical form, but the more

northern form is too close to it to be separated even as a variety. The achenes (excluding the bristles) are indistinguishable. Two specimens in the Gray Herbarium indicate a remarkable range for *S. validus*, or a very closely allied species. *Aitchinson 465* and *689* from Afghanistan have the lax, drooping umbel of ferruginous spikelets and the general aspect of *S. validus*. The style is 2-cleft, the achenes, not fully mature, are flavescent, 2.1 mm. long, rounded obovate. The scales furnish the only distinction; these are minutely pubescent along the midrib and at the summit with soft appressed hairs, not thick and stubby as in *S. validus*.

SCIRPUS occidentalis (Watson), n. comb.

Scirpus lacustris var. *occidentalis* Watson, Bot. Cal. 2:218 (1880).

Perennial: rootstock horizontal, scaly: culm erect 1.2–2 m. high, .5–2 cm. in diameter at base, attenuate upward, usually hard especially in eastern specimens, olive green, smooth, minutely striate, leafless, or basal sheaths produced into acuminate blades broader than found in *S. validus* and sometimes 20 cm. long; sheaths with hyaline border becoming fibrillose; lowest sheath usually somewhat indurated: inflorescence a compound, usually erect and congested umbel of few to many spikelets, subtended by a single erect, attenuate, terete or obscurely 3-sided bract, channeled only at the base (1–7 cm. long); rays 0–5 cm. (rarely over 3 cm.) long, rather stout, plano-convex, the margins scabrous; bractlets vaginate, pale, spotted with ruddy brown, scarious, lacerate-fimbriate, slightly viscid-pubescent especially toward the summit, abruptly mucronate; secondary rays when present 0.3–2 cm. long: spikelets in capitate clusters of 2–7 or solitary (the greater number capitate in every umbel), pale grayish brown to dark rusty brown, cylindrical or ellipsoidal, obtuse, 4–5 by 10–18 mm., densely fruited, the scales overlapping $\frac{1}{2}$ their length or more: scales $\frac{1}{4}$ – $\frac{1}{3}$ longer than the achenes, oblong-ovate, obtuse and emarginate, spotted with ruddy brown, viscid-pubescent along the midrib and on the upper third with stubby hairs, the hyaline margin lacerate, ciliate; the strong, pale midrib exerted into a prominent scabrous tip: style 2-cleft to near the base; bristles 6, slightly shorter than the achene, reddish brown, retrorsely barbed: achene dark grayish brown, obovoid, abruptly acuminate 1.7–1.9 by 2.5–3 mm., in section unequally biconvex, hexagonally reticulate under a lens.

Type locality: "California ranging from San Diego county to British Columbia and eastward to Texas and Colorado."

Scirpus lacustris var. *occidentalis* Watson seems to have no type specimen extant. Dr. Watson cites no definite specimens and there is no specimen of *S. occidentalis* from San Diego county in the Gray or National Herbaria of a date previous to the publication of var.

occidentalis. In the Gray Herbarium are the following marked "*S. lacustris*, var. *occidentalis*" in Dr. Watson's handwriting: NEVADA, mouth of Run [?] River, alt. 5000 ft., July 1868 — immature (*Watson* 1212, King Exped.): BRITISH COLUMBIA, Saturna Island, 1858 — immature (*Lyall*, Oregon Boundary Comm.): CALIFORNIA, Yosemite Valley, 1866 — nearly mature (*Bolander* 6231, Geol. Surv. Cal.); Santa Barbara, 1875 — very immature (*Rothrock* 57, Wheeler Exped.): NEW MEXICO, 1873 — immature (*Loew*, Wheeler Exped.); 1851-52, — immature (*Wright* 1940). In the National Herbarium is one specimen marked var. *occidentalis* by Dr. Watson: NEVADA, Humboldt Pass, alt. 6000 ft., Sept., 1868 — fully mature (*Watson* 1212).

The discrepancy in the data of these two specimens of *Watson* 1212 is probably due to giving the same number to all collections of one species during the expedition.

Specimens examined.—Those cited above: NEWFOUNDLAND (*Waghorne* — very immature, but scales large and viscid): MAINE, Mattawamkeag Lake (*Fernald*); Ship Pond, Elliottsville (*Fernald* 419); Chemo Pond, Bradley (*Briggs*); Monhegan Island (*F. G. Smith*); Rangeley Lakes (*Furbish*): NEW HAMPSHIRE, Dixville Notch (*Boott*): MASSACHUSETTS, Revere (*Young*); Fresh Pond, Cambridge (*Boott*): NEW YORK, shore of Lake Ontario (*Wibbe*): ONTARIO, Sarnia (*MACOUN* 34,582): OHIO, Licking Co. (*Jones*): INDIANA, Lake Michigan basin (*Hill*, *Lansing* 962, *A. Chase* 345); ILLINOIS, South Chicago (*A. Chase* 1628): ROMEO, Desplaines valley just beyond Lake Michigan watershed (*Umbach*): WISCONSIN, Lake Michigan basin (*R. Bebb*): MISSOURI, Courtney (*Bush* 23): NEBRASKA, Middle Loup River, Thomas Co. (*Rydberg* 1388 in part): MONTANA, Madison River (*Rydberg* 2277); Madison River (*Shear* 521); Snake River (*A. & E. Nelson* 6571): WYOMING, Little Missouri Buttes (*Griffiths* 593): COLORADO, Canon City (*Brandege*): UTAH (*Bishop*): NEW MEXICO (*Vasey*): ARIZONA (*Rothrock* 330a); Santa Cruz (*Pringle*); (*Vasey*); vicinity of Flagstaff (*MacDougal* 275): BRITISH COLUMBIA (*Lyall*): WASHINGTON, Cascade Mts. (*Tweedy* 2); Falcon Valley (*Suksdorf* 85); Lake Chelan (*Gorman* 697); Okanogan Co. (*Elmer* 539); (*Vasey* 11): OREGON (*E. Hall* 562); Wasco Co. (*Leiberg* 865); CALIFORNIA, San Bernardino Valley (*Parish* 956); Walkers Basin (*Rothrock* 280); Tulare Co. (*Coville & Funston* 1736); Placer Co. (*Vasey*).

Scirpus occidentalis is distinguished from *S. validus* by achene $\frac{1}{3}$ larger, by scales $\frac{1}{4}$ – $\frac{1}{3}$ longer than the achene and nearly twice as long as scales of *S. validus*, viscid-pubescent, overlapping $\frac{1}{2}$ their length or more; by the cylindric, more densely fruited spikelets in capitate clusters; and by the denser umbels and harder culms. From *S. lacustris* L. it is distinguished by the 2-cleft style, lenticular achene, viscid-pubescent scales, cylindric, densely fruited spikelets, and by the terete or obscurely 3-sided involucre bract.

This species shows much variation. Specimens from New England and the Great Lakes have smaller culms, spikelets darker in color, often longer; the scales more viscid (in many western specimens scales are but very slightly viscid), and umbels less congested than usual in western specimens, though the latter vary from dense, globular heads to open umbels with rays 5 cm. long. Plants having this open umbel can be determined by the achene and scale.

SCIRPUS heterochaetus, n. sp.

Culms erect, 1–2 mm. high, 4–10 mm. in diameter at base, terete, usually hard, light green, smooth, minutely striate, leafless, or basal sheaths produced into acuminate blades 2–15 cm. long and 3–5 mm. wide; the sheaths with hyaline borders lacerate and slightly fibrillose: inflorescence an open, suberect compound umbel of 9–17 spikelets, subtended by a single erect attenuate terete bract, channeled only at the base (3.5–7 cm. long); rays 1–6 cm. long, very slender, plano-convex, smooth or slightly scabrous on the margins; bractlets vaginate, pale brown to wine color, long acuminate, the hyaline margin lacerate-fimbriate, smooth except the scabrous excurrent tip of the midrib; secondary rays .5–1.5 cm.: spikelets solitary, ovoid-oblong, acute or subacute, 3–4 by 8–10 mm., reddish brown: scales $\frac{1}{3}$ longer than the achenes, ovate-oblong, subacute, deeply emarginate, thickly spotted with wine-color toward the summit, pale below, the hyaline margins erose, glabrous except the prominently excurrent scabrous, slender tip of the midrib: style 3-cleft to below the middle: bristles 2–4 (usually 2) slender, fragile, unequal, shorter than the achene (usually not over $\frac{1}{2}$ the length of the achene), dark red, retrorsely barbed or nearly smooth: achene fuscous 1.7–1.8 by 2.6–3 mm., obovate, abruptly mucronate, in section triangular, the ventral side plane or slightly concave, the dorsal angle rounded, hexagonally reticulate under a lens.

Type: "*Brewer & Chickering*, swamps, Havana, N. Y., June 26, 1858," specimen in the National Herbarium, no. 27,519.

This is the form referred to (fide note on above specimen) by Dr. Gray in Manual, Fifth Ed. p. 563: "A slender variety with narrower heads, very smooth scales and shorter or fragile bristles, was sparingly collected by Rev. J. W. Chickering at Havana, N. Y."

Other specimens examined:—VERMONT, Milton, July 25, 1893 (*Grout*): NEW YORK, Havana (*Chickering* in Gray Herb.): ILLINOIS, Athens, July, 1869 (*E. Hall* in Herb. Field Columbian Mus. no. 35,203); MINNESOTA, Fort Snelling, July 24, 1888,—a robust specimen with immature spikelets (*Mearns*); Minnesota or South Dakota [no locality given] July 24, 1839 (*Geyer*, Nicollet's Northwestern Exped.): NEBRASKA ("Ex Father *Wibbe*"): OREGON, Swan Lake, Klamath Co. July 14, 1895 (*Applegate* 759): IDAHO, valley of Lake

Tesemini, Kootenai Co., specimen with slender culms 2 m. high, spikelets 23 in number, slightly larger than those of the other specimens, scales with scabrous midrib, otherwise glabrous; achenes very immature, bristles 2-4 very fragile as in the other specimens, doubtless a form of this species (*Sandberg* 687).

Scirpus heterochaetus is distinguished from *S. validus* and *S. occidentalis* by the 3-cleft style, by the triquetrous achene, by the fragile unequal bristles fewer and shorter, and by the glabrous scales. From *S. lacustris* L., to which it is closely allied, it is distinguished by the terete involucre bract, solitary spikelets, and fragile unequal bristles fewer and shorter. Apparently rare; the above specimens all lack rootstocks. It is worthy of note that four of the above specimens bear some note by the collector of variation from *S. lacustris* so called.

SCIRPUS CALIFORNICUS (C. A. Meyer) Britton, Ill. Fl. 1: 267 (1896).

Elytrospermum Californicum C. A. Meyer, Mém. Acad. St. Pétersb. (V.) 1: 201, pl. 2 (1831).

This remaining species of the *lacustris* group in this country has been recognized as distinct, and is so easily determined by its aristate scales and broad, dark red bristles plumose below, that it needs no delineation here.

The greater number of specimens examined were immature. In *Scirpus*, as in the other genera of *Cyperaceae* it is very important that plants be collected at maturity.

Thanks are due the Gray Herbarium, National Herbarium, and herbaria of the New England Botanical Club and of the Field Columbian Museum, for the loan of specimens, and to Prof. C. V. Piper for helpful criticism.

DIVISION OF AGROSTOLOGY, Department of Agriculture, Washington, D. C.

EXPLANATION OF PLATES 52 AND 53.

- a. *Scirpus validus* Vahl (*A. Chase* 1136, Chicago).
- b. *Scirpus lacustris* L. (*Reinsch*, Erlangen).
- c. *Scirpus occidentalis* (Watson) Chase (c. *A. Chase* 1628, South Chicago, illustrating Lake Michigan and New England form; cc. *Leiberg* 865, Oregon, illustrating the western form).
- d. *Scirpus heterochaetus* Chase (*Brewer & Chickering*, Havana, N. Y. type specimen).

Corresponding parts drawn on the same scale; inflorescence natural size; spikelet $\times 5$ diam., achene with cross section, and scale $\times 10$ diam.